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TABLE OF CONTENTS.

WILLIAMS, Persistence of Varieties of the Bacillus Diphtheriæ and of Diphtheria-like Bacilli.—HODENPYL, Sponge Found in Operation Wounds.—BERKELEY, Proteosoma-Malaria in Sparrows.—CONDIT, Multiple Diverticula of the Colon; Fibromyoma of the Stomach.—SCHULTZE, False Diverticula of the Sigmoid Flexure; Aneurysmal Dilatation of the Ductus Arteriosus in a Male Infant; Specimen of Conglomerate Tubercles of the Liver.—WOOD, A Specimen of the Rhabdomyoma of the Testis; A Specimen of Myoma of the Small Intestine.—COLEMAN, The Presence of a Surgical Needle in the Abdominal Cavity.

DR. JAMES EWING, *President.*

PERSISTENCE OF VARIETIES OF THE BACILLUS DIPHTHERIÆ AND OF DIPHTHERIA-LIKE BACILLI.

ANNA W. WILLIAMS, M.D.

The investigation may be conveniently grouped into the four following heads:

1. A study of the dipththeria and diphtheria-like bacilli found in a series of clinically typical diphtheria cases at the Hospital for Contagious Diseases; (*a*) serial smears of cultures directly from throats and noses, (*b*) pure cultures isolated from these cultures.

2. A study of the diphtheria and diphtheria-like bacilli found in healthy and diseased throats in a town during an epidemic of diphtheria; (*a*) smears of cultures

directly from throats, (*b*) pure cultures isolated from these cultures.

3. A study of diphtheria and diphtheria-like bacilli found in sore throats during a epidemic of diphtheria at a home for destitute children ; (*a*) pure cultures.

4. A study of pure cultures of diphtheria and diphtheria-like bacilli from sources other than those given above ; (*a*) on various artificial culture media grown under various conditions, (*b*) in living tissues of guinea-pigs, white rats, and gold finches, (*c*) in symbiosis with other bacteria.

The results obtained from these studies may be summarized as follows :

1. (*a*) In a series of ten cases of clinically typical diphtheria only one variety of the specifically-virulent diphtheria bacillus was obtained from the throat of each case throughout the course of the disease and until suspicious bacilli disappeared ; (*b*) from different parts of the same patient only one variety of specifically-virulent diphtheria bacillus was obtained, (*c*) "pseudo" varieties were found no more frequently at the end than at the beginning of the disease, (*d*) pure cultures continued to show characteristics similar to the original cultures for many culture generations.

2. (*a*) Under normal conditions different varieties of diphtheria-like bacilli may be found in the same throat ; (*b*) many throats in a single institution may contain many diphtheria-like bacilli with no case of diphtheria resulting ; (*c*) there are many distinct varieties of diphtheria-like bacilli all of which in several pure cultures retain the characteristics of the original culture.

3. (*a*) In each case of diphtheria apparently contracted from the same source the same variety of virulent diphtheria bacillus was found ; (*b*) this variety remained

the only variety of virulent diphtheria bacilli found until its disappearance; (*c*) no gradations in pseudo types were found, the same type seen in the first examination continued to be present in later ones; (*d*) pure cultures continued to show characteristics similar to the original cultures for many culture generations.

4. (*a*) Some cultures when grown on artificial media show certain changes, but each culture changes in its own way, retaining its distinct individuality. After many culture generations, however, especially when transplantations are made at short intervals, the different varieties of the specifically-virulent diphtheria bacillus tend to approach each other, or rather to run in lines parallel with a common norm; (*b*) no non-virulent morphologically typical bacillus has been made virulent, neither have solidly staining "pseudo" varieties or other atypical varieties been made virulent or morphologically typical.

These studies seem to demonstrate that the morphologically typical diphtheria bacillus is a distinct species from the atypical diphtheria-like bacilli, and so-called "pseudo" forms; and that it has many true morphologic varieties or sub-species which while showing transitory ontogenic variations due to change in environment and life habit have more or less persistent phylogenic characteristics which re-appear when the organism is placed in a previous environment.

Discussion.

Dr. Park: It is really extraordinary how the characteristics of different bacilli are found to persist for long periods when changed from one culture medium to another and then restored to their original medium. I believe that many of the changes reported in the literature

on the subject may be attributed to errors of observation. One thing that particularly interested me was the fact, shown by observations at the Willard Parker Hospital, that, whereas, the diphtheria bacilli apparently differed in virulence at different times when tested in bouillon, in reality they only differed in their rate of growth, and were very much alike when tested in ascitic bouillon. The propability is that in the throat they are always very much the same in respect of virulence.

The practical conclusion which we are entitled to draw from the investigation is that when bacilli began by being virulent they remained virulent to the end; and on the other hand when they are not virulent at the start, they do not become so. This being so, it does not seem that there is any use of the physician making repeated tests in any one case with the view of ascertaining the degree of virulence of the bacilli present. Summing up, the observations establish beyond doubt that the bacillus does not change from one type to another. The experiments have been most carefully conducted and I believe that the conclusions arrived at are correct.

SPONGE FOUND IN OPERATION WOUNDS.

EUGENE HODENPYL, M.D.

The specimens and drawings which I exhibit this evening were obtained from two cases in which sponge had been found in operation wounds. These two cases are illustrative of the experience common to pathologists that rare cases are apt to occur in pairs (Binary occurrence of rare cases). These two cases came under my

notice within a period of seven days. Regarding the rarity of the condition I might say that I have never met with it before, nor have any of my colleagues in the laboratory seen any similar case. The sections from the specimens were sent to several pathologists, but none except Dr. Welch were willing to hazard a diagnosis. Dr. Welch said that he regarded the peculiar structures as sponge, and based his theory on the recollection of a case of similar kind which he had seen years ago.

When the cases were studied more carefully the identity of the condition and the accuracy of this opinion became apparent.

The first case was that of a man seventy years of age, who suffered from epithelioma of the pharynx. Three and a half months before he had been operated upon from a primary growth. Directly on the site of the operation, embedded in the connective tissue, I came upon these curious masses, two or three in number. They presented solid threads often branching and anastomosing, sometimes presenting a double contour which stained with a large variety of stains. Although "foreign body" was at once suspected, I was thrown off my guard by the fact that the adjacent muscle showed curious degeneration, and it was thought that various phases between the muscle and these curious masses could be traced.

The second case was even more remarkable. The patient was admitted to the hospital with a history of recurrence of epithelioma of the lip. He had been operated on eight years before for a primary growth. The appearance of the sections greatly resembled those of the first case, except as was to be expected the spicules of sponge showed more evidence of absorption. Many of them were surrounded by giant cells.

Discussion.

DR. WOOD: Dr. Hodenpyl's experience has been very valuable to me, for shortly after the examination of the specimens referred to, I had a similar case in St. Luke's Hospital and I should undoubtedly have considered them as some kind of degeneration if I had not heard of these two cases and been instructed by them of the origin of the condition.

PROTEOSOMA-MALARIA IN SPARROWS.

W. N. BERKELEY, M.D.

The specimens which I submit were obtained last September while at work on the subject of malaria in birds. It was easy in Bronx Borough to find English sparrows (passer domesticus) infected with malarial parasites corresponding in all morphological characters with the proteosoma of Labbe. I examined nearly a hundred birds; seventy-five per cent were infected, and ten to fifteen per cent severely infected. The latter while apparently doing well in the open, sickened rapidly in confinement, refusing to eat and sitting with ruffled feathers in a corner of the cage. The temperature of one bird reached 108.8° F., although I will not venture to say that this figure represents an unusually high temperature in birds.

The heart blood of one bird showed many red cells infected with five to seven sporocytes, apparently multiple infections though I have not noticed similar observations in the literature and am not fully able to claim that this particular malaria infection was a proteosoma case. For the rest the stained specimens speak for themselves.

MULTIPLE DIVERTICULA OF THE COLON; FIBROMYOMA OF THE STOMACH.

J. D. CONDIT, M.D.

The specimen was removed from a female, aged seventy, who gave a history of a long standing chronic nephritis with chronic constipation and frequent attacks of bronchitis extending over many years.

The autopsy which was done in the pathological department of St. Luke's Hospital by Dr. Wood, showed an hypertrophy of the heart with atheroma of the coronary vessels of the aorta and the smaller arteries, marked emphysema of the lungs and chronic diffuse nephritis. The stomach and the small intestine were normal. In the colon were numerous small diverticula, the largest of which measured about one and one-half cm. in diameter. These diverticula were arranged in two irregular rows on either side of the mesenteric border and did not average much over one cm. in diameter. They occupied chiefly the walls of the transverse and descending colon, the sigmoid flexure, and the upper portion of the rectum; but there were a few in the ascending colon. They were filled with small hard fecal masses and communicated with the lumen of the gut by a small constricted neck. There seemed to be no connection between these diverticula and the exit of the portal system of the vessels. No enterliths were found in the diverticula.

The microscopical examination of the diverticula showed that the walls contained the normal coats of the colon. The mucous membrane was somewhat flattened out by pressure; the peritoneal coat was normal. The submucosa was very thin and the muscularis could be seen to still cover the wall of the diverticulum; but was reduced to a very thin layer. The mucosa and submucosa

were infiltrated with leucocytes, and showed a moderate amount of chronic inflammation. The presence of the muscular coat in the diverticule may be explained by the fact that the protusions from the wall of the coat were still small, and that atrophy of the muscularis had not yet taken place, as is seen in larger diverticula which measure between three and five cm. in diameter. Such diverticula have been recently shown before the Pathological Society by Dr. Hodenpyl, and in his case the muscularis had disappeared.

Hensemann has shown that the diverticula of the small intestine appear chiefly at the site of exit of the intestinal veins from the gut, close to the mesenteric attachment, and that they usually contain no muscular coat but are hernia of the mucous membrane. In the colon, however, Edel has shown that diverticula are true pouches at first, and that later the muscularis atrophies. They occur chiefly in the aged and in cachectic individuals, associated with atrophy of the muscular coat and extension of the gut with gas or feces.

The second specimen which I present was an accidental find at autopsy of a female, aged sixty, whose death was due to carcinoma of the uterus with involvement of the rectum and bladder. On the anterior wall of the stomach near the pylorus was a small oval tumor, two by one by one and a half cm., with a smooth surface and sessile base. The tumor was very hard and was adherent to the mucous membrane, but protuded on the outer surface of the stomach. When cut across the tumor was very dense with a capsule which contained the remains of the muscular coat and submucosa.

Microscopical examination of the tumor showed it to be composed of irregularly interlacing bundles of fibrous tissue and smooth muscle surrounded by a cap-

sule of connective tissue on the inner surface, and externally blending with the muscularis of the stomach wall. On the portion of the tumor nearest the mucosa there was a moderate amount of inflammation.

These fibromyomata of the stomach wall are rather infrequent. In 1898, Steiner was able to collect only about fifty-six cases of myomata of the gastro-intestinal tract, seventeen of these being in the stomach wall. They are most frequently situated the lumen, but may be contained in the wall or on the external surface, or finally attached to the stomach by a pedicle. They may be oval and smooth, or irregular and lobular in form. Those containing much connective tissue may show softened areas and small cysts filled with clear fluid or blood. In a few cases these cysts have become infected from the bowels and have discharged their contents into the peritoneum with resulting general peritonitis. In a few cases, malignant change of the myomatous tissue is described with formation of metastases in neighboring lymph nodes; but as a rule these tumors are benign and are discovered only accidently or at autopsy.

FALSE DIVERTICULA OF THE SIGMOID FLEXURE; ANEURYSMAL DILATATION ON THE DUCTUS ARTERIOSUS IN A MALE INFANT; SPECIMEN OF CONGLOMERATE TUBERCLES OF THE LIVER.

OTTO H. SCHULTZE, M.D.

The specimen of false diverticula of the sigmoid was obtained from a case which was complicated with fecal

abscess and general septic peritonitis, followed by purulent meningitis and lobar pneumonia. It was removed at autopsy from a man about forty years of age. One of the many false diverticula which contained hard fecal masses, through ulceration and subsequent infection, had given rise to an abscess between the sigmoid and left iliac fossa, which had then ruptured into the peritoneal cavity. No clinical history was obtainable. This condition may account for some cases of perisigmoiditis, or cases running a course resembling that of appendicitis, the symptoms being referable to the left instead of the right side.

The second specimen was obtained from the body of a male infant which was found in a school sink. There were no marks of violence. The ductus arteriosus was dilated and filled with recently clotted blood. Its pulmonary end was closed; its aortic end open and about 7 m.m. in diameter. The duct was 2 cm. in length and over 1 cm. in width, thus presenting the condition of a large sacculated aneurysm in the anterior mediastium, bounded on the left side by the left lung, on the right side by the left auricle, coming in relation anteriorly with the left phrenic nerve and posteriorly with the left pneumogastric nerve. Ecchymoses were found on the pleura, pericardium, and pericranium. No foreign material was found in larynx, trachea, or bronchi. The blood was fluid except the recent clot found in the ductus arteriosus. The condition pointed to asphyxia, yet the positive diagnosis of asphyxia by submersion could not be made. It is by no means uncommon, in New York at least, to find that infants whose bodies are found under circumstances arousing suspicion as above may nevertheless have died from natural causes; since many poor and ignorant inhabitants of large cities are not aware that the authorities will bury

their dead. It is an open question in this case as to what effect the condition described may have had in causing death by pressure upon the pneumogastric or phrenic nerves. The size of dilated ductus compared with the size of the anterior mediastium of a three weeks old infant is a matter of some importance.

The liver specimen which I present contained besides many miliary tubercules a large number of conglomerate tubercles, varying in size from 0.5 to 1.5 cm. in diameter whose centers were fluid and bile stained, whose margins were cheesy and surrounded by connective tissue, presenting under the microscope bile pigment and amorphous ditritus in the center; then an area of coagulation necrosis in which miliary tubercles could be faintly made out, and finally tubercle tissue and granulated tissue, in many advanced to the formation of fibrous connective tissue. The subject, a male, eighteen years of age, had a most extensive chronic tuberculous bronchopneumonia, with large cavities, from one of which a hemorrhage had taken place which was the immediate cause of death. The extent of tuberculous inflammation in this subject was most remarkable: the larynx, spleen, almost the entire intestinal tract, peritoneum, bronchial and retro-peritoneal lymph nodes were affected. Large conglomerate tubercles were found in the spleen and throughout the peritoneum. It seems less probable that these so-called bile ducts tubercles originate from an infection of the bile ducts than from an erosion or inclusion of the ducts by the process of tuberculous inflammation in the periportal connective tissue.

A SPECIMEN OF RHABDOMYOMA OF THE TESTIS; A SPECIMEN OF MYOMA OF THE SMALL INTESTINE.

F. C. WOOD, M.D.

The history of the case is that of a young man of eighteen, who had been rather feeble in his youth but had had no diseases except the exanthemata of childhood. Three months before admission he noticed a swelling in the right testicle. The tumor grew rapidly to the size of a fist, but was not painful and but slightly tender in the softened areas. When the patient was examined it was found that the tumor had replaced the testicle on the right side and was freely movable in the scrotum. On palpation there were found to be hard and soft area in the tumor. The softer areas seemed in many cases small cysts. The tumor was removed without difficulty, and the patient was discharged, cured.

The tumor when hardened measured eleven by eight by seven cm. It had completely replaced the testicle, but had not extended beyond the tunica albuginea. The remains of the testicle and epididymis were still to be found near the periphery of the tumor, apparently pushed aside by the new growth. The cut surface showed many cysts, the largest ones being between one and two cm. in diameter. There were also areas of about the same size of yellow opaque tissue evidently very cellular. A few very small nodules of cartilage could be seen scattered through the cut section. Microscopical examination showed that the tumor was largely made up of loose connective tissue stroma filled in many places with a very large amount of striated muscle fibers showing the spindle and spherical forms which are so often seen in embryonic muscle fibers. In only a moderate number of

the fibers could striations be made out, but the staining reactions and the arrangement of the nuclei left no question that many of the smaller round cells were muscle cells not cut transversely, but remaining undeveloped. The connective tissue stroma also showed an embryonic type, very often cellular and softened, with occasional areas of mucous degeneration.

Occasionally the section showed areas of cartilage. In other portions there were epithelial tubules remaining, such as are often found in the teratomata of the testicle. In fact, this tumor might well be classed as a teratoma with excessive development of striated muscle. It does not belong to the group of pure myoma of the testicle of which about six cases have been collected from the literature.

I have also to report a case of myoma of the small intestine. This tumor was an accidental find in the course of a ventrofixation of the uterus. It was attached to the small intestine, a loop of which prolapsed during operation. This loop was evidently a portion of the lower ileum, but the exact distance from the cecum to the tumor was not made out. The mass was a lobular, dark, fibrous tumor attached by a short pedicle to the intestinal wall. It was quite vascular on its surface. The mucous membrane of the intestine were incised around the base of the pedicle and the tumor thus removed.

When hardened it measured four and one-half by three and one-half by three cm. The surface was quite sharply lobular and still showed deep blood staining. A cross section of the tumor showed that it was vascular and also contained a number of cysts. The mucous membrane of the intestine was still adherent to the base of the pedicle. Microscopical examination showed the

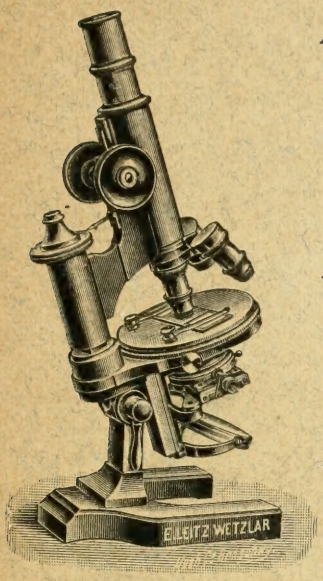
tumor to be largely composed of unstriated muscle and fibrous tissue, evidently arising from the muscular coats of the intestine. The cysts were due to the softening of the surrounding fibrous tissue, and were not lined with epithelium. They contained blood and clear serum.

As Dr. Condit has shown, these tumors are rare, especially so in the small intestine, but are of little clinical importance except for the possibility of their forming traction diverticula, or when provided with a long pedicle, forming a loop about the intestine and so causing obstruction.

A SURGICAL NEEDLE ENCYSTED IN THE ABDOMINAL CAVITY.

WARREN COLEMAN, M.D.

The needle which I show you this evening was taken from the abdominal cavity of a young woman who entered the City Hospital for treatment for alcoholism and chronic nephritis. She died after several weeks. Upon opening the abdomen at autopsy, the omentum was found to be adherent to the upper part of the bladder. The needle—a curved surgical needle—lay upon the omentum about one inch above the adhesion, with its concavity directed upward, and was completely encysted. It was not until the point of the needle was laid bare that its real nature was determined. The needle measured seven-eighths of an inch from eye to point. A suprapubic hysterectomy had been performed some time previously—probably a year or more, judging from the appearance of the scars—and the needle had been left in the abdominal cavity.



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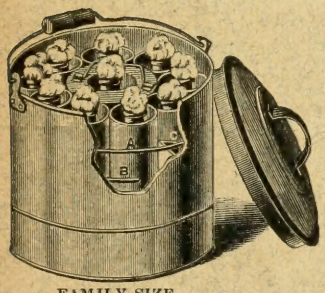

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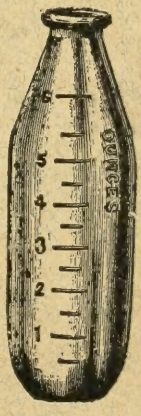

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